

THE COLLOCATION OF A SUTURE AND FISSURE IN THE HUMAN FŒTUS.*

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AT the meeting of this Association over which I had the honor to preside last year, I delivered a somewhat extended address upon a general question.¹ In retiring from office, therefore, it may be permitted me not only to make my remarks brief, but also to confine them to the statement of a single fact, with commentaries thereon. So far as I am aware, it is entirely new, which, as most of us know to our mingled chagrin and gratification, can seldom be claimed for any observation or idea in these days of intense encephalic activity.

Although, from the practical standpoint chiefly, considerable attention has been given to the topographical relations of the sutures and fissures in the adult, I am not aware that their fœtal relations have been noted or even mentioned as worth noting.

Statement of Facts.—In three alcoholic human fœtuses in the museum of Cornell University, estimated at from three to seven months, the lambdoidal suture directly overlies a short but deep fissure.

I submit herewith a photograph and drawing of the dorso-caudal aspect of the cerebrum of one of these.²

* Remarks of the retiring President of the American Neurological Association, July 21, 1886.

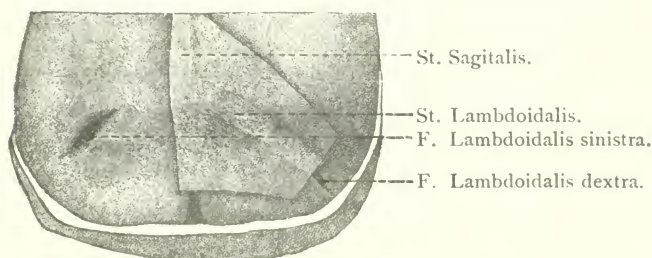
¹ See Bibliography at the end of this article.

² The photograph was taken by my colleague, Prof. S. H. Gage, and the drawing was made by his wife. The accompanying figure represents the preparation of natural size. The fissure should appear deeper and more sharply defined.

Before photographing, the line of the lambdoidal suture was inked on the pericranium for the sake of distinctness; in the drawing, the locations of the sutures are indicated as slightly raised tracts about 3 mm. wide.

From the left side the calva and dura have been removed, excepting a narrow strip along the meson; on the right there has been retained a strip 12–25 mm. wide, including most of the lambdoidal suture and part of the sagittal.

On the right the point of a fissure projects slightly beyond the cut edge of the calva, just entad of the lambdoidal suture; on the left the same fissure is wholly exposed, but it is antitropic with the right suture, and was situated directly entad of the left at the time I exposed the brain. The fissures are about 1 cm. long, and nearly half as deep. The edges and sides are smooth and natural, and there is no indication that they were artificially produced.



Among three other foetal brains, estimated at from three to seven months, which had been previously exposed so that the existence of the collocation cannot be determined, the fissure is distinct in one, but absent or irregular in the other two. It is not represented in the figures of foetal brains by Schwalbe (p. 574, fig. 352.), or Pansch (Taf. iii., figs. 7 and 9). Evidently numerous observations are needed with this special point in view.

In foetuses of the last two months, and after birth, no collocation exists. If the fissure persists, it lies caudad of the suture.

The Name.—In 1868, Owen applied the name *lambdoidal* to the *dorsal end of the occipital fissure*, but the appellation has not been adopted by any subsequent writer, and the

correlation between the suture and the fissure here discussed is so marked and perfect that I hope the distinguished English anatomist will not object to the transfer. For the present, at least, I shall speak of it as the *lambdoidal fissure*.¹

Not a New Fissure.—Although, as I am led to believe, but little known, the lambdoidal fissure is not altogether new. In 1868, Bischoff represented (12, Taf. iv., figs. 7-10, pp. 58-60), under the name of "fissura perpendicularis externa," what seems to me to be the lambdoidal, and it is referred to by Huxley, Kölliker, and Ecker; but these authors have, I think, mistaken it for other fissures, as will be more fully stated in connection with the question of its homology. The fissure is also shown, but not named, by Mihalkovics (Taf. iii., fig. 26), and by Gratiolet (Pl. xxix.). Finally, this is the fissure referred to in my recent paper "On the Pari-occipital" (76, p. 6) as "foetal, or possibly transitory."

Location.—The fissure may be described in the fœtus not only as situated at the lambdoidal suture, but also as coinciding with about the middle third of a line extending obliquely across the hemicerebrum from at or near the dorsal outcrop of the occipital fissure, forming an angle of 45 degrees with the meson, and related sagittally to the caudo-lateral outline. Approximately, therefore, it forms one of the two straight sides of an octant of the dorso-caudal surface of the hemicerebrum, when that surface is perpendicularly regarded.

Form.—Unlike the earlier states of most fissures when no longer than this, the lambdoidal is deeper than wide, and half as deep as long; unlike them, also, the sides and ends are nearly vertical, and the bottom approximately flat and pointed at each end.

An Early Fissure.—With the possible exception of the dorsal end of the occipital, there are no other fissures on the convex surface of the parieto-occipital region of the ex-

¹ On page 126 of the work above named, Owen speaks of the correspondence in position between the coronal and lambdoidal sutures and fissures; but he is treating of adult monkeys, not human fœtuses, and his "coronal" fissure is the central or Rolandic, while his "lambdoidal" is part of the occipital, on the one here under consideration.

ample figured; the lambdoidal therefore appears before the parietal and paroccipital fissures.

Ental Correlative.—So early and deep an ectal depression might well be expected to represent an ental or ento-coelian elevation, like the hippocampal and calcarine fissures and some others which will be mentioned in the "Notes on the Brain," which I shall present later in this meeting. So far, however, no ental correlative has been observed, but the earlier foetuses in which the lambdoidal fissure exists have not yet been sufficiently examined in this respect.

Homology.—By Bischoff (12, 58-60) and Huxley (p. 492) this fissure is regarded as representing the "external perpendicular or occipito-temporal fissure" of apes, and the latter states that its "filling-up" is, aside from size, the chief characteristic of the human brain. Ecker (46) and Kölliker (Fig. 359) regard it as the first appearance of the "transverse occipital fissure," which I have recently attempted to show (76) is really part of the paroccipital. The special subject of these remarks, namely, the collocation of the lambdoidal fissure with the suture of the same name, need not be affected by the question of its homology, so I content myself on this occasion with dissenting from the interpretations of the anatomists just named, and hope on a future occasion, in connection with the so-called "ape-fissure" of man, to give the grounds for the view that the fissure persists but becomes obscured and almost lost among the numerous and complex fissures of the caudal end of the adult occipital lobe.¹

The Collocation Transitory.—Although, as just stated, I am inclined to think that the lambdoidal fissure itself is persistent, yet its attribute of collocation with the suture of the same name is certainly temporary, and thus, like all transitory conditions, interesting as suggesting a permanent ancestral feature.

Another Case of Collocation.—In at least two of the foetal

¹ It is possible, though I think improbable, that the lambdoidal fissure becomes what Wernicke and Schwalbe (p. 550, Fig. 342, *O A.*) have called "occipitalis anterior," but for which, in a paper (81) prepared since this address was presented, I have proposed the mononym *exoccipitalis*, for distinction from the *præoccipitalis* of Meynert.

brains examined, the coronal suture on each side was found to overlies directly a well-marked fissure, which was apparently the precentral. There was, however, some laceration of the surface in these cases, and I refrain from enlarging upon the small number of observations on imperfect material.

Questions.—The following questions naturally occur in connection with the subject :

1. At what age does the lambdoidal fissure first appear?
2. Is it from the first collocated with the suture of that name?
3. How generally is the fissure present?
4. When the fissure is present, is the collocation invariable?
5. What is the proximate cause of the collocation? Is it mechanical, or vascular? or is this a mere coincidence with no relation of cause or effect, or even of relation to some common cause?
6. At what age does the collocation cease to exist?
7. What is the proximate cause of the loss of collocation?
8. Has this fissure any relation with the occipital?
9. Does the fissure ever disappear entirely?
10. If not, does it remain independent or become continuous with others?
11. Does the collocation exist in other mammals, especially in the primates?
12. For many reasons all facts bearing upon the physical peculiarities of man are of interest. Hence we wish to ascertain whether either the fissure itself, or its collocation, or the temporary existence of the fissure, or the cessation of the collocation, are peculiar to man or to the primates.

Until these have been satisfactorily cleared up, no opportunity should be lost for observation. Hence I venture to offer a few

Suggestions.—1. The foetuses should be weighed and measured, and notes made of the various conditions by which unknown ages are estimated.

2. Foetal heads, or entire bodies, or the brains alone, should be injected with alcohol, and then with red starch mass, as directed by S. H. Gage.

3. The brains should be exposed with the scissors and nippers, carefully, and in brine if necessary; the parietal bone of one side should be removed, beginning near the meson, and leaving the frontal and occipital bones to support the corresponding regions of the brain until the relations of the sutures and fissures have been determined.

4. Preparations should be preserved and photographed.

5. If possible these brains should be exposed by the anatomist himself or by a trained preparator under his eye. The present remarks might not have had an occasion if the exposure of the brain had been delegated as a purely mechanical operation.

In resigning the chair to my successor,¹ I desire to congratulate him and the Association upon the choice, and to express my personal pleasure in the change of date, by which my own attendance upon the meetings will not, as heretofore, be rendered difficult or impossible on account of annual duties elsewhere.

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¹ Dr. Chas. K. Mills.